AD-A153 710 SBSS (STANDARD BASE SUPPLY SYSTEM) DATA ELEMENT ARCHITECTURE(U) AIR FORCE LOGISTICS MANAGEMENT CENTER GUNTER AFS AL D J BLAZER FEB 85 AFLMC-LS841045 1/1

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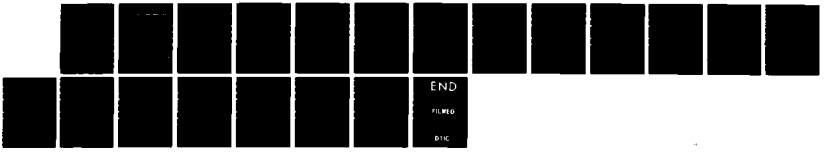

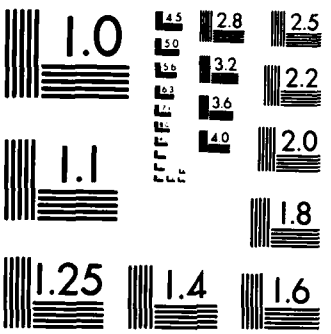

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PHASE IV SBSS DATA ELEMENT ARCHITECTURE

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AFLMC Report LS841045

February 1985

AIR FORCE LOGISTICS MANAGEMENT CENTER
GUNTER AFS, AL. 36114

ABSTRACT

Prior to the Air Force's acceptance of the software maintenance of the Phase IV Standard Base Supply System (SBSS), the Data Systems Design Office needs to "baseline" the system. In this report we project the data elements, records, programs, and files necessary to support the future SBSS.

EXECUTIVE SUMMARY

We have recommended several improvements to existing stockage policy. Our recommendations require data elements, records, and programs over and above the existing system. Prior to Air Force acceptance of the software maintenance of the Phase IV Standard Base Supply System (SBSS), the Data Systems Design Office needs to "baseline" the system. Since we are recommending changes to the baseline, we were tasked to predict the data elements required for future stockage policy changes. Once the future data elements are identified, the current SBSS' records and data elements can be expanded as necessary and then baselined.

We projected the data elements, records, and programs necessary to implement completed, in-work, and future Air Force Logistics Management Center projects. We provided a brief summary of why the data element, record or program is needed. We also identified three areas for stockage policy data requirements:

a. Interface with computers, especially base level microcomputers.

b. An increased need for demand history.

c. Reporting and requirements determination by weapon system.

We recommend the Phase IV system be baselined to accommodate our projected system enhancements.

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CHAPTER I

THE PROBLEM

BACKGROUND

Prior to the Air Force's acceptance of the software maintenance of the Phase IV Standard Base Supply System (SBSS), the Data Systems Design Office (DSDO) needs to "baseline" the system. The DSDO needs to know the records, record lengths, data elements, programs, and files necessary to support the future SBSS. Since we are generating stockage policy initiatives that require data elements over and above the existing system, the baseline is changing. For example, the creation of the data element, "Date of Stockage Priority Code 5 Assigned," was necessary to implement our economic order quantity excess policy recommendations.

PROBLEM

Our tasking was to project the data elements required for future stockage policy initiatives and the records, programs, and files where those data elements logically fit. Once the future data elements are identified, the current SBSS records can be expanded as necessary and then baselined. This should ease the implementation of the future stockage policy initiatives.

The objectives of this study are to:

a. Identify the data elements, programs, files, and record lengths necessary to implement stockage policy changes we currently have waiting implementation or projected to be implemented.

b. Provide a baseline on which to base the Phase IV data and record elements architecture.

CHAPTER 2

ANALYSIS

OVERVIEW: We document our analysis in five sections. First we describe our approach to identifying the data elements necessary to implement three groups of our projects: completed, in-work, and pending. The next three sections of this chapter are also divided into those three groupings; completed, in-work, and pending. In the final section we provide a summary of our analysis.

APPROACH

We have used "crystall balling" to provide an educated guess of the data elements, record lengths, programs, and files necessary to satisfy the SBSS requirements through the 1990s. Using the, "AFLMC Supply Stockage Policy Master Plan [MP]," as the roadmap for future stockage policy initiatives, we identified for each project in the master plan the data elements, records, and programs necessary to implement the proposed policy.

We start with the completed projects, then go to projects in work and finally to pending. We divided the projects into these three groupings, because we know what data elements are needed for the completed projects. We are fairly certain of the data elements needed for in-work projects. We provide an educated guess for the pending projects. In the summary, we provide what we think are the trends or direction the SBSS will take over the next 10 years.

COMPLETED PROJECTS

In this section we determine the additional data elements, program variables, programs, and files necessary to implement completed LMC stockage policy projects. We include projects that have been recently implemented ("Revised Safety Level," "XF3 Operating Level," "EOQ Excess," and "EOQ Cost Variables"). Although these projects have been implemented, and the data elements added to the SBSS, the implementation was done under the constraints of the current U1050 system. Many of the added data elements logically belong on the item record, but due to system constraints, had to be placed on a detail record. In this study, we had no such constraints.

In Table 2-1, we display the additional data elements necessary for each of our completed projects. We list the data elements under the following headings:

Item Record: The data element should be included on the item record.

Other Records: The data element should be included (or excluded) from some other record.

Program Variables: The data element should be computed in a program. The data element does not need to be stored; it is only needed in the program.

Programs: An entry under this column means a new program must be written to provide the indicated data elements.

Files: An entry under this column means new files must be created to store data. We define files as a group of records.

COMPLETED PROJECTS
DATA ELEMENTS

PROJECT	ITEM RECORD	OTHER RECORDS	PROGRAM VARIABLES	PROGRAMS	FILES
EOQ Excess	Mission Impact Code (can delete date of SPC 5 assigned)		Retention Rule		
EOQ Cost Variables			Cost Variables		
Order and Ship Time Computation			Variance of Order and Ship Time		
Demand Forecasting (Revised Safety Level)	Sum of Demand Squared		Demand Variance, Lot Size		
XF3 Analysis (XF3 Operating Level)			Economic Order Quantity		
XF3 Retention	Mission Impact Code, Expand Demand Data		Retention Rule		
Local Purchase Order and Ship Time	Method of Procurement (JBX)		Variance of O&ST, Truncation Point		
Inventory Policy for High Backorder Items	Mission Impact Code, Lot Size Indicator, Expand Number of Orders		Lot Size		
EOQ Mission Impact	Mission Impact Code (MIC)		C Factor Assignment	Logic to Assign MIC	
EOQ Range Model	MIC		Update Range Model and Cost Variables		

PROJECT	ITEM RECORD	OTHER RECORDS	PROGRAM VARIABLES	PROGRAMS	FILES
Streamlining LP Procedures	Method of Procurement (JBX), Minimum Amount Vendors		UMMIPS Time Standards	Yearly Support Requirements, Required Delivery date, Quantity Discount	Descriptive File
Proactive Demand Forecasting	Mission Impact Code			Automated Special Levels (MAJCOM and Base), D165 Price	
Manpower Assessment and Impact Model				Data Processor	M32 Data
Alternative Approaches to the SBSS EOQ Depth Model			Funding and Workload Constraints	Aggregate Model Logic	

TABLE 2-1

The need for each of the data elements described in Table 2-1 is documented in our reports. This study's bibliography provides a listing of our completed reports. However, we need to explain the entry for the "EOQ Excess" project, which was implemented worldwide in FY85. Since the current system does not have a mission impact code, we had to use the stockage priority code to develop a retention rule. We had to create a new data element--"Date of SPC 5 Assigned." With a minimum impact code, the retention rule would be to declare an item excess if:

The mission impact code is:	and the Date of Last Demand is greater than:
1	3 years, 3 months
2	3 years
3	2 years, 9 months
4	2 years, 6 months.

Thus, the "Date of SPC 5 Assigned" is unnecessary whenever a mission impact code is implemented.

IN-WORK PROJECTS

In Table 2-2, we list the data elements needed for our "in-work" projects. Again we list the data elements required for the item record, other records, or in a program. We also list any additional programs or files needed to implement the recommendations of these projects.

IN-WORK PROJECTS
DATA ELEMENTS

PROJECT	ITEM RECORD	OTHER RECORDS	PROGRAM VARIABLES	PROGRAMS	FILES
Base Supply Analysis				Data Processor	M32 Data, Transaction History
Dyna-METRIC	Mission Impact Code, Quantity Per Application			Data Processor	
Reparable Simulation Model				Transaction History for DFM	
Contingency Support Requirements Forecasting	Mission Impact Code, Quantity per Application			Data Processor	
Logistics Support for Deployed Forces		Supplementary Item Record to collect Demand for Forward Operating base		Fill or Pass Logic	
Combat Supplies Management System		MAJCOM Records		MAJCOM Programs	
Base-Depot Stockage Policy - EOQ				Additional Data in Requisition	
Enhanced Stock Fund Management				Data Processor	Stock Fund Program (microcomputer

TABLE 2-2

The data elements needed for each project are described below.

Base Supply Analysis: We are developing a microcomputer management analysis capability. A data processor program is needed with the Sperry 1100 to get M32, transaction history, item record, repair records, and detail record data to the microcomputer. This will require the capability to build an M32 data file on line, at least temporarily.

Dyna-METRIC: We have developed a microcomputer version of Dyna-METRIC. A data processor program is needed with the Sperry 1100 to get item record and repair cycle record data downloaded to the microcomputer. In addition, a mission impact code could identify items that will ground a weapon system, which is an assumption of the model. Eventually we perceive a need for a quantity per application (QPA) code to use in mini Dyna-METRIC and aircraft availability models.

Reparable Simulation Model: We are building a simulation model that replicates base-level processing and stockage policy for reparable assets. In order to completely replicate the base's reparable processes, we must have all the "transactions" that affect reparable assets. Currently, transactions with transaction identifier code "DFM" are not included in the transaction history. These transactions should be collected at least at the 12 bases which are providing records to the Air Force Data Bank here.

Contingency Support Requirements Forecasting: We foresee a need to use Dyna-METRIC type logic for other than aircraft systems. Thus we need the same data elements for this project as we needed for Dyna-METRIC. That means we need mission impact code, quantity per application, and a data processor.

Logistics Support for Deployed Forces: We are analyzing a concept to support deployed forces at a forward operating base (FOB) by using an in-theater staging base. The in-theater staging base is a Standard Base Supply System that would be augmented with spares, consumables and repair capability. All requisitions from the FOB will be sent fill or pass to the in-theater staging base. This will require new software. Record space will also be needed to collect demand data from the FOB.

Combat Supplies Management System: We are conducting a systems analysis on the Combat Supplies Management System. Our recommendations will involve records and programs on the H6000 at MAJCOM headquarters.

Base-Depot Stockage Policy - EOQ: We are building a multi-echelon inventory model to determine the effectiveness of current stockage policy for EOQ items. We anticipate a need for the base to provide additional demand data to the depot, either in the requisition or some other interface method.

Enhanced Stock Fund Management: We are developing a microcomputer application for stock fund management. A data processor program to download data from the Sperry 1100 to the microcomputer will be needed. In addition a file containing the stock fund program will be needed, at least temporarily.

PENDING PROJECTS

Our pending projects provide the final group. Table 2-3 provides our best estimate of the additional data elements necessary to implement on future projects.

PENDING PROJECTS
DATA ELEMENTS

PROJECT	ITEM RECORD	OTHER RECORD	PROGRAM VARIABLES	PROGRAMS	FILES
Demand Forecasting and Repair Cycle Time	Increase Demand Data	Pipeline Variance	Pipeline Variance		
Life Cycle Spares Support Listing	Mission Impact Code	Weapon System Consumption		Weapon System Reporting	Standard Reporting Designator File
Aircraft Availability	Misison Impact Code, Quantity per Application	Weapon System Consumption			
Base Level Weapon System Availability	Mission Impact Code, Quantity per Application	Weapon System Consumption			
Base Level Aggregate Management				Data Processor	Microcomputer Files
Statistical Performance Measurement				Data Processor	Microcomputer Files
Enhanced Listing Management				Data Processor	Microcomputer Files
Materiel Requirements Planning				Data Processor	Microcomputer Files
Stock Fund Credit Policy			Change Credit Policy		
Stock Fund Stratification			Change Logic for Reporting		

TABLE 2-3

The data elements needed for each project are described below.

Demand Forecasting and Repair Cycle Time: We plan to conduct a detailed analysis of the assumptions and data elements necessary to compute the depth and range of reparable assets. From our analysis of reparable retention policy, we need to expand the demand data fields--the number of orders and the cumulative recurring demands--to 2 to 3 years. Also, we anticipate additional pipeline data to compute variances will be needed. This entails collecting repair data for longer periods of time and perhaps by shop. If one shop requires more time to repair than another, the system should know and respond to that fact. The variance of shop repair time and shop queue time may also be necessary. Perhaps a forecasting method like exponential smoothing can be used which would limit the data elements needed. Regardless, more data, to a finer level of detail, will be needed for longer periods of time. This data will be used to schedule, prioritize and control repair and determine stock requirements.

Life Cycle Spares Support Listing: We plan to develop a method to track consumption against standard reporting designators (SRD) to evaluate Initial Spares Support Lists (ISSLs), to develop New Activation Spares Support Lists (NASSLs), and to develop MAJCOM Spares Support Listings. The concept is to centrally collect consumption data by SRD at AFLC. A mission impact code will be needed on the item record. In addition, consumption must be recorded by weapon system, which will require additional records. A program must be developed to centrally report the data. Also a standard reporting designator file must be established at base level which would include the configuration of the end item at the base.

Aircraft Availability and Base-Level Weapon System Availability: These projects will examine requirements determination and performance reporting using aircraft availability measures. A mission impact code and quantity per application code will be needed, as well as consumption by weapon system.

Base-Level Aggregate Management: We plan to develop a microcomputer model to assist the Chief of Supply in determining the effectiveness of modifying base-level repair procedures. A data processor program will be needed to transfer data to the microcomputer.

Statistical Performance Measurement: We plan to develop a microcomputer statistical program to assist the Chief of Supply in predicting supply performance. A data processor program will be needed.

Enhanced Listing Management: We plan to use a microcomputer to automate the myriad of listings and card decks that must be currently maintained by SBSS personnel. We will need a data processor program to download Sperry 1100 listing data to the microcomputer.

Materiel Requirements Planning: Materiel Requirements Planning (MRP) is a system to support dependent demand environments. An example of a dependent demand environment is civil engineering workorders. Once we know we are to build a house, we know how much lumber, nails, and paint, etc., that is needed. We have developed a microcomputer MRP model and demonstrated it to Civil Engineers, depot maintenance, and worldwide cryptologic installation

functions. The requirement for the Phase IV SBSS is to provide an interface for parts status. Thus a data processor program and microcomputer file will be needed.

Stock Fund Credit Policy and Stock Fund Stratification: We have been tasked to review the current credit return policy and the current methods to stratify inventory. This will require changes to the current stock fund software and M20 reporting program.

SUMMARY

There are some common themes in reviewing the future requirements of the SBSS data element architecture. In this section we summarize those common themes.

The first and most prominent future requirement is to **PROVIDE AN INTERFACE WITH OTHER COMPUTERS AND ESPECIALLY WITH BASE-LEVEL MICROCOMPUTERS.** There is a need in the immediate future to provide a flexible method to download data from the Sperry 1100 to a microcomputer. A myriad of microcomputer programs are available now or will be very soon. Examples include mini "Dyna-METRIC," the "Base-Level Supply Analysis Model," and the "Manpower Impact Assessment Model." The data processor programs must be simple enough for base-level supply programmers and yet flexible enough to extract any type and amount of data contained on the Sperry 1100. The data fed to the microcomputer must be in a compatible format.

Besides the data processor program, an interface also means communication between computers. The ultimate interface is direct electronic hook-up, but data transfer via diskette is also an alternative.

The second data element requirement is for increased demand data history especially for repair cycle assets. We have shown that repair cycle assets display erratic demand patterns--many times going without a demand for a year only to have a significant consumption the next year. **WE MUST BASE DEMAND LEVELS ON MORE THAN NINE MONTHS OF DEMAND HISTORY.** Thus the three "number of demands" field should each include a year's demands. The field should be expanded to two digits, so the number of demands is not limited to nine. Repair and shipping pipeline times must also be kept for longer periods of time. The data fields must either be expanded or some alternative forecasting method (for example, exponential smoothing) will have to be used. Research by RAND [12] and others [2, 14] indicates the current system is inaccurately estimating the variance of demand and not estimating pipeline time variances at all. It will be necessary to collect data to accurately compute these variance estimates. Finally, we should use consistent demand data; we should not use one forecast of demand for excess reporting and another to establish demand levels. If we expand the demand data history, we can correct this problem.

The final trend is weapon system reporting and requirements determination. DOD has stated capability assessment, accounting, reporting, and requirements determination by weapon system is a goal for all services [DOD]. We have several projects moving in that direction. They will all require additional data elements and records. Weapon system projects will require the implementation of mission impact codes and quantity per application data. In addition, performance reporting will have to be segregated by weapon system. This will require new files and expanded weapon system consumption data.

CHAPTER 3

CONCLUSIONS/RECOMMENDATIONS

CONCLUSIONS

1. The Standard Base Supply System data elements, files, and record formats should be baselined prior to the Air Force's acceptance of software maintenance for the Phase IV system.

2. The Phase IV SBSS must be able to interface with base-level microcomputers.

3. The SBSS item record must be expanded to provide additional demand history.

4. The SBSS must be expanded to provide weapon system reporting and requirements determination.

5. Adding the projected additional data elements and records will facilitate future stockage policy implementations.

RECOMMENDATIONS

1. We work with DSDO/LGS to develop detailed data information, for example data element and record length to further define the Phase IV baseline requirements. *(OPR: AFLMC/LGS, DSDO/LGS)*

2. Baseline the Phase IV SBSS so that it will incorporate the data elements, records and files necessary to support projected projects. (OPR: HQ USAF/LEY, OCR: DSDO/LGS)

3. Begin planning the interface between the Phase IV SBSS and base-level microcomputers. (OPR: HQ USAF/LEY, OCR: DSDO/LGS)

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